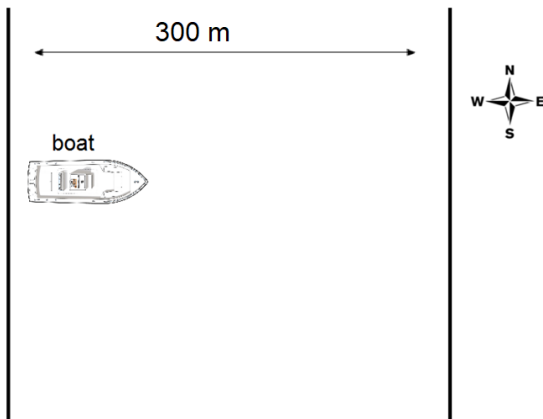


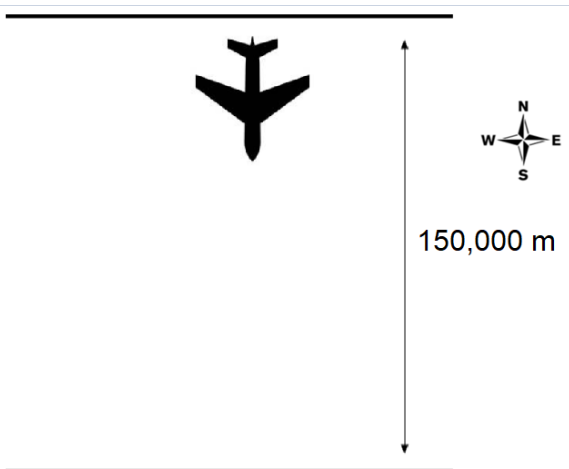
**Boat and River Type Problems**  
**Unit: Vectors and Projectiles**  
**Honors Physics**

**Name:**

1. A motorboat traveling 5 m/s East encounters a current traveling 2.5 m/s South. The width of the river is 300 meters.
  - a) Sketch the velocity vectors on the diagram, including the resultant vector.
  - b) Determine the resultant velocity of the boat (magnitude and direction expressed in degrees).
  - c) Determine the time it takes the boat to cross the river.
  - d) Determine how far downstream the boat is when it reaches the other side.
  - e) If the water were flowing at 7 m/s, would the boat cross the river in more time, less time, or the same amount of time? Explain.



2. A plane traveling 80 m/s due South encounters a wind traveling 15 m/s West. The North to South distance to reach its destination is 150,000 meters.
  - a) Sketch the velocity vectors on the diagram, including the resultant vector.
  - b) Determine the resultant velocity of the plane (magnitude and direction expressed in degrees).
  - c) Determine the time it takes the plane to travel the North-South distance of 150,000 meters.
  - d) Determine how far West the plane is when it reaches the other side.



3. An ant is running 0.20 m/s East across a conveyor belt traveling 0.30 m/s South. The width of the conveyor belt is 1.5 meters.
- Sketch the velocity vectors on the diagram, including the resultant vector.
  - Determine the resultant velocity of the ant (magnitude and direction expressed in degrees).
  - Determine the time it takes the ant to cross the conveyor belt.
  - Determine how far South the ant is when it reaches the other side of the conveyor belt.
  - If the conveyor belt were moving at 5 m/s, would the ant cross the conveyor belt in more time, less time, or the same amount of time? Explain.

